AF

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE
BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

In re Application of: Buie et al.	§		
Serial No.: 10/024,958	§	Group Art Unit:	1765
Confirmation No.: 3439	§	Examiner:	Kin-Chan Chen
Filed: December 18, 2001	§		
For: Etch Process for Photolithographic Reticle Manufacturing with Improved Etch Bias	§		

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Dear Sir or Madam:

REPLY BRIEF

Applicants submit this Reply Brief to the Board of Patent Appeals and Interferences in response to the Examiner's Answer dated December 2, 2004. Please charge any fees that may be required to make this Brief timely and acceptable to the Patent Office, to Deposit Account No. 20-0782/4213P1/KMT.

STATUS OF CLAIMS

Claims 1-24 are pending in the application. Claims 1-24 were originally presented in the application. Claims 1-24 stand rejected in view of several references as recited in the Appeal Brief. The rejection of claims 1-24 based on the cited references was appealed. All claims are pending as filed in the Appeal Brief.

GROUNDS OF REJECTION

1. Claims 1-24 stand rejected under 35 U.S.C. §103(a) as being obvious over *Kornblit et al.* (U.S. Patent No. 5,948,570, hereinafter "*Kornblit*") in view of *Meyer et al.* (U.S. Patent No. 4,600,686, hereinafter "*Meyer*"). The Examiner has stated as evidence *Yasuzato et al.*, (U.S. Patent No. 5,750,290, hereinafter "*Yasuzato*") and *Demmim et al.* (U.S. Patent No. 6,635,185, hereinafter "*Demmim*"), which were not mentioned under Grounds of Rejection in any matter prior to the Examiner's Answer. *Takada et al.,* (U.S. Patent No. 4,350,563, hereinafter "*Takada*") and *Tachi et al.*, (U.S. Patent No. 4,406,722, hereinafter "*Tachi*"), which are also relied on as evidence, have not been added or mentioned as part of a ground of rejection by the Examiner in the Examiner's Answer.

THE REFERENCES

The Examiner relies on the following references:

Author	Publication Title or Reference number	Publication Date
Kornblit et al.	U.S. Patent No. 5,948,570	September 7, 1999
Meyer et al.	U.S. Patent No. 4,600,686	July 15, 1986
Evidence: *Yasuzato et al.*	U.S. Patent No. 5,750,290	May 12, 1998
Evidence: *Demmim et al.*	U.S. Patent No. 6,635,185	October 21, 2003
Evidence: *Takada et al.*	U.S. Patent No. 4,350,563	September 21, 1982
Evidence: *Tachi et al.*	U.S. Patent No. 4,406,722	September 27, 1983

BRIEF DESCRIPTION OF THE REFERENCES

Kornblit et al. discloses etching a chromium layer with a gaseous mixture of oxygen gas, chlorine gas, and nitrogen as etchant species, in combination with a patterned organometallic resist. (*See,* Abstract, col. 2, lines 44-56, col. 4, lines 10-24) *Kornblit et al.* discloses that nitrogen is an essential constituent used in the etchant chemistry to dilute the oxygen gas and chlorine gas chemistry to minimize undercutting of the chromium layer and provide a more anisotropic etch pattern. (*See,* col. 4, lines 24-33)

Meyer et al. discloses depositing a chromium layer, depositing and patterning a photoresist, forming an etch resistant skin with a second chromium layer disposed over the patterned photoresist, baking the substrate so that the chromium reacts with the photoresist, and etching the unreacted chromium. (*See,* Abstract, col. 2, lines 38-67, Figs. 1 and 2) *Meyer et al.* discloses etchant species of carbontetrachloride (CCl_4) and oxygen gas. *Meyer et al.* further discloses carrier gases of argon and carbon monoxide. (*See,* col. 3, lines 3-16)

The reference of record, *Yasuzato*, presented as evidence by the Examiner, discloses chromium etching with a gas containing chloride (*See,* col. 2, lines 12-15, col. 8, lines 59-62). The reference of record, *Demmim*, presented as evidence by the Examiner, discloses substrate etching with fluorinated carbonyl compounds (*See,* col. 2, lines 41-62) The reference of record, *Takada*, presented as evidence by the Examiner, discloses aluminum etching with a gas containing carbon chloride and boron chloride (*See,* abstract) The reference of record, *Tachi*, presented as evidence by the Examiner, discloses etching of silicon with PF_5 (*See,* abstract)

ARGUMENT

THE ISSUES UNDER 35 U.S.C. §103

THE EXAMINER ERRED IN REJECTING CLAIMS 1-24 UNDER 35 U.S.C. §103 BECAUSE THE SUBJECT MATTER OF *KORNBLIT*, ALONE OR IN COMBINATION WITH THE SUBJECT MATTER OF *MEYER* DOES NOT TEACH, SHOW, OR SUGGEST ETCHING A METAL, CHROMIUM, LAYER WITH CARBON MONOXIDE AND CHLORINE GAS.

In response to the Applicants' argument regarding the respective subject matter of the *Kornblit* and *Meyer* references, The Examiner asserts that it would have been obvious to modify *Kornblit* by using carbon monoxide as taught by Meyer because each composition is useful for etching chromium. Applicants respectfully disagree with the Examiner's conclusions since the subject matter of the respective references do not lend itself to choosing select constituents to teach the composition of the method recited in claims 1-24.

Kornblit. discloses the use of oxygen gas and chlorine gas as specific etchant specie, and describes as critical, the use of nitrogen gas to dilute the etchant specie and to minimize undercut of chromium material being etched. In fact, the critical use of nitrogen specifically in combination with chlorine and oxygen in *Kornblit* teaches away from the use other compounds, such as carbon monoxide. By contrast, *Meyer* discloses that the chromium disposed on a photoresist material may be etched in a plasma containing one (1) part carbontetrachloride (CCl_4) and one (1) part oxygen in three parts carrier gases, such as argon and carbon monoxide. *Meyer* discloses the critical use of carbontetrachloride (CCl_4) and oxygen in the etching composition and *Meyer* does not disclose that the carrier gas, such as nitrogen gas as stated in *Kornblit*, is critical.

As previously argued by applicant, the combined references do to teach or suggest the composition as recited in claims 1-24. There is no suggestion or motivation in the combined references to combine the nitrogen dilutant etchant chemistry of *Kornblit* with the carbontetrachloride (CCl_4) and oxygen etching gas of *Meyer.*

Therefore, the rejection based on the combination of *Kornblit* and *Meyer* should be reversed.

Yasuzato, which was not used to reject the pending claims as shown in the Examiner's Answer, is asserted as evidence with regard to claim 6 of finding equivalence among chlorine containing gases. Applicants assert that *Yasuzato* is being used in hindsight to rationalize picking and choosing selective gases from the *Kornblit* and *Meyer* processing gases regardless of any suggestion or motivation to combine the subject matter of the respective references. *Yasuzato,* alone or in combination with the subject matter of *Kornblit* and *Meyer*, does not suggest or motivate the combination of carbon monoxide and chlorine gas as etchant species in etching a chromium layer. As *Yasuzato,* is not asserted in a rejection to provide any suggestion or motivation to combine the subject matter of *Kornblit* and *Meyer*, any teaching inferred from the reference supporting the rejection should not be considered.

Demmim, which was not used to reject the pending claims as shown in the Examiner's Answer, was asserted in the Advisory Action as evidence that compositions and processing parameters are well-known result effective variables in the art of dry etching, which can be optimized. Applicants respectively note that *Demmim*, issued on October 221, 2003 and published on Jul 25, 2002, after the filing date of the present patent application, and therefore, does not provide evidence of knowledge of the art at the time of the filing of the application, and should be removed from consideration with regard to the Grounds of Rejection as asserted by the Examiner.

Applicants further respectfully respond to this asserted reference on the grounds that optimization is limited to within the scope of the references, and is applicable to what is suggested or motivated in the references. As asserted above, there is no suggestion or motivation in the subject matter of the references to use a composition of chlorine and carbon monoxide, and thus, no optimization of the processing parameters with the subject matter of the respective references could be inferred to teach, show, or suggest the subject matter as recited in claims 1-24. Further, if the Examiner is asserting that the combination of constituents, and not the ratios of etching gases as exemplified in the previous Examiner's actions, is based on optimization, the references still lack any suggestion or motivation to combine the respective subject matters to

provide a composition; and if such a combination of constituents could be rationalized, which selection of constituents could then be optimized, would as stated earlier be against the teaching of the references, and thus, destroy obviousness.

With regard to *Takada et al.* and *Tachi et al.*, which were not used to reject the pending claims as shown in the Examiner's Answer, Applicants do not contest that helium is a carrier gas. However, Applicants have contested, as stated above and in the Appeal Brief, that the cited references teach, show, or suggest the subject matter as recited in claims 1-24.

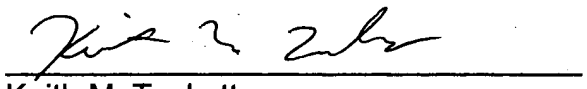
Thus, at least for the reasons stated above, claims 1, 13, and 20, and claims dependent therefrom, are patentable over *Kornblit* in view of *Meyer*. Therefore, the Appellants submit that claims 1, 13, and 20, and claims dependent therefrom, as they now stand, fully satisfy the requirements of 35 U.S.C. §103 and are patentable thereunder.

CONCLUSION

For the reasons advanced above, Appellants respectfully urge that the rejection of claims 1-24 as being unpatentable under 35 U.S.C. §103 is improper. Reversal of the rejection in this appeal is respectfully requested.

If necessary, please charge any shortage in fees due in connection with the filing of this paper, including extension of time fees, to Deposit Account No. 20-0782/4213P1/KMT, and please credit any excess fees to the above referenced deposit account.

Respectfully submitted,



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